

Replacing Arithmetic Mean

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Simplify & Automate

- Simplify & automate asphalt pay quantity determination
 - Save Time
 - Statewide CPR
 - Reduce Mistakes
 - Reduce Pay Conflicts
- Use data currently entered into QC Roadway Report
- A few additional entries per pay item
 - Plan Quantity
 - Engineer Directed Quantity Changes

Calculations Overview

- Tonnage-weighted Gmm for each pay item
 - Tonnage-weighted Gsb for FC-5
- For Tonnage Pay Items, determine:
 - Adjusted Plan Quantity Tons
 - Based on Plan Quantity & Tonnage-weighted Gmm
 - 105% of Adjusted Plan Quantity Tons
 - Pay Adjustment
 - Pay for “tonnage placed” up to 105% of Adjusted Plan Quantity Tons
- Square Yard Pay Items, determine:
 - Plan Quantity Tonnage
 - Based on Plan SY & thickness
 - Adjusted Plan Quantity Tonnage
 - Based on Plan Quantity & Tonnage-weighted Gmm
 - Ratio of Tonnage Placed to Adjusted Plan Quantity Tonnage
 - Pay Adjustment based on $(\text{Ratio}-1) * \text{Plan Quantity SY}$
 - Ratio limited to 1.05 maximum

Tonnage Pay Items

- For each Pay Item
- Convert Plan Quantity to an Adjusted Plan Quantity

Adjusted Plan Quantity =

Plan Quantity * Tonnage-weighted Gmm/Design Gmm

- For FC-5, use Gsb's in place of Gmm's

Square Yard Pay Item

- A similar adjustment is made
 - First we have to convert the SY to tons
 - Determine Adjusted Plan Quantity tons
 - Determine Ratio of Tons Placed to Adjusted Plan Quantity tons
 - Make pay adjustments to plan quantity SY
- For each pay item you'll have:
 - Plan Quantity SY
 - Design Thickness unique to the pay item

Square Yard Pay Item

- Determine Adjusted Plan Quantity Tons
 - $\text{Plan Quantity Tons} = \text{thickness (in)} * \text{Tonnage weighted Gmm} * 43.3 * \text{Plan Quantity SY} / 2000 \text{ lbs/ton}$
- Determine Ratio = Tons Placed/Adjusted Plan Quantity
- Determine SY Pay Adjustment
 - $\text{Pay Adjustment to Original Plan Quantity} = (\text{Ratio} - 1) * \text{Original Plan Quantity}$
 - Ratio shall not exceed 1.05
- Make Pay Adjustment to Plan Quantity SY

Miscellaneous Asphalt (339)

- Misc Asphalt is handled like other tonnage pay items
- Except Design uses spread rate = 100 lbs/sy to account for lower density typically achieved with 339 asphalt
 - Design calculation of plan quantity will remain
 - Adjusted Plan Quantity & all other calculations performed on other tonnage pay items are the same

Overbuild

- Need to have separate quantities for Structural Asphalt and Overbuild in a pay item
- QC will enter each separately (structural asphalt & overbuild)
- Pay up to 105% on structural asphalt
- Pay quantity placed on overbuild

Related Specification Changes

- 234-9
- 330-6
- 334-7
- 337-11
- 339-7

Associated Intended Use	Unit of Measure	Plan Quantity	Engineer Directed Quantity Change	Typical Section Thickness (SY items only)	Total Plan Quantity (tons)	Project Tonnage-Weighted Gmm or Gsb	Adjusted Total Plan Quantity (tons)	105% Project Pay Item Limit (tons)	Project Cumulative Tons (per pay item)	Ratio (Final Tons/Adj Plan Qty tons)	Quantity Adjustment	Actual Quantity Paid
Base Group 1	Square Yards	1,390.00 sy		4	305.74996	2.5320	304.7870	320.03	305.42000	1.00207697	3 sy	1,390 sy
Base Group 10	Square Yards	150.00 sy		6.5	53.61623	2.5320	53.4474	56.12	56.20000	1.05150199	8 sy	150 sy
Base Group 15	Square Yards	40.00 sy		9	19.79676	2.5320	19.7344	20.72	18.98000	0.96177195	-2 sy	40 sy
SP TL-D	Tons	2,200.00 tons			2,200.00000	2.5500	2,208.6614	2,319.09	2,214.52000	1.00265255	0.0 tons	2,214.0 tons
SP TL-D 76-22	Tons	965.00 tons			965.00000	2.5500	968.7992	1,017.24	965.25000	0.99633648	0.0 tons	965.0 tons
SP TL-C	Tons	13,570.00 tons			13,570.00000	2.5330	13,532.6119	14,209.24	13,573.15900	1.00299625	0.0 tons	13,573.0 tons
FC-5 76-22	Tons	2,900.00 tons			2,900.00000	2.7670	3,045.2751	3,197.54	3,147.69000	1.03363074	0.0 tons	3,147.0 tons
FC-12.5 TL-C 76-22	Tons	3,300.00 tons			3,300.00000	2.5450	3,306.4961	3,471.82	3,342.99000	1.01103704	0.0 tons	3,342.0 tons

Pay Item	Associated Intended Use	Unit of Measure	Plan Quantity	Engineer Directed Quantity Change	Typical Section Thickness (SY items only)	Total Plan Quantity (tons)	Project Tonnage-Weighted Gmm or Gsb	Adjusted Total Plan Quantity (tons)	105% Project Pay Item Limit (tons)	Project Cumulative Tons (per pay item)	Ratio (Final Tons/Adj Plan Qty tons)	Quantity Adjustment
285715	Base Group 15	Square Yards	837.00 sy	-228.00 sy	9	301.40567	2.3560	279.5716	293.55	263.07000	0.94097554	-36 sy
334 1 13	SP TL-C	Tons	11,877.70 tons			11,877.70000	2.3560	11,017.2682	11,568.13	11,932.91000	1.08310970	-364.8 tons
337 7 32	FC-9.5 TL-C Rubber	Tons	11,290.34 tons			11,290.34000	2.3570	10,476.9021	11,000.75	11,600.67000	1.10726147	-599.9 tons
339 1	Misc.	Tons	12.00 tons			12.00000	2.3560	11.1307	11.69	5.02000	0.45100453	0.0 tons

Where are we at?

- Industry review of Specs completed
- Recently provided responses to comments
 - One modification needed to 334 for overbuild
- July 2015 projects will be using this system

What's next?

- Obtain input from Final Estimates (Resident, District and State) regarding Plan Quantity Sheet in QC Roadway Report
- Feedback on QC Roadway Report, any unintended consequences of Spec change, etc.

Questions